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ances, and sometimes with one or two individuals who had even been down to Moorunde; and at the very furthest point reached, I heard of two natives having crossed thence from Mount Bryan, after receiving blankets from me at Moorunde at the last May issue.

In concluding my Report I would fain hope that if no other good has been accomplished by our hurried and harassing journey, at least the way has been opened for a future expedition to travel with ease and safety and on friendly terms with the natives. The fact of so small a party as three Europeans and a native passing on such good terms among the very numerous tribes of the Darling, once considered so hostile, may, I think, fairly warrant my drawing such a conclusion; at all events, I shall be most happy to make the attempt during the ensuing winter if no other occupation interferes, and if His Excellency will provide me with the equipment necessary to take the field for a couple of months. That time would, I think, suffice for tracing up "Laidley's Ponds," and for examining the whole of the ranges near Mount Lyall, in order to determine the probability or otherwise of a route being found under them leading to a better tract of country inland. I confess my own impressions are unfavourable to such an opinion; but still the exploration would be interesting, and would decide the character of the only part of the southern portion of this continent upon which even the slightest doubt remains. I may remark that the ranges, as seen to the N.W. from the Darling, struck me as bearing a strong resemblance in appearance to those visible to the N.W. from the great south bend of the Murray River, and I thought they looked more connected than I expected to have found them. I omitted to state that, in travelling up the Darling, we found the feed for our horses generally very bad, and the deep muddy banks of the river rendered it very important to select an eligible place for the horses to drink at, to avoid their slipping in and getting drowned; whilst the strong tenacious character of the soil in the alluvial flats bordering upon the river caused it to open into deep holes and cracks, rendering it both difficult and dangerous to ride over them.

XI.—*Some Account of Peel River, N. America.* By Mr. A. K. ISBISTER, late H.H.B.C.'s service. Addressed to the Secretary of the Royal Geographical Society.

SIR,—The interest with which the members of the Royal Geographical Society view all attempts to extend our knowledge of the new or unexplored regions of the earth, has induced me to lay

Sketch Map
of
PEEL RIVER
by
M^r A.K. Isbester
1845.



[illegible]

Sketch Map
of
PEEL RIVER
by
M^r A.K. Isbester
1845.

Longitude West from Greenwich

Pub^d for the Journal of the Royal Geographical Society by John Murray Albemarle St London 1845.

John Arrowsmith.

[illegible]

before you the following brief notices, the result of a residence of some years in the Arctic regions of North America.

There is, perhaps, no portion of the globe of which less is known, either in its physical or geographical relations, than that to which I have just referred. Hearne, about eighty years ago, was the first to penetrate through the country, and, under circumstances of difficulty and privation of which few, except those who have been similarly engaged, can form an adequate conception, he succeeded in reaching the sea at the mouth of Coppermine River. His narrative, in which he announced this discovery, inasmuch as it went to controvert the prevalent opinion of the time, that the northern shores of America were *not* washed by the ocean, was received with little or at least far from general faith, and it was not till Sir Alexander Mackenzie, by descending the river which bears his name, re-discovered the ocean, that the existence of an Arctic Sea was placed beyond dispute. The discoveries of these two enterprising travellers gave a new impulse to geographical science, and by reviving the dormant but still popular question of the north-west passage, and thus diverting the national mind into a more favourite channel, mainly contributed to throw inland discovery into the shade. Sir Alexander Mackenzie in 1792 undertook a second expedition with the object of penetrating across the continent to the Pacific, the result of which was equally satisfactory with his former journey, three years before, to the shores of the Polar Sea. Sir John Franklin, in addition to the valuable accessions he made to our knowledge of the sea-coast, the survey of which was the more especial object of his two expeditions, furnished much important information regarding the interior, and what was scarcely of less consequence, gave us an accurate delineation of the route which he had followed in common with Mackenzie, who, though remarkably correct in his general details, could not, from his previous habits, be expected to possess the scientific knowledge of his successor. The surveys of Mackenzie, Franklin, and, at a subsequent period, of Sir George Back, may be said to comprise all the accurate information we possess of the extensive region lying between the parallel of Red River, in latitude 50° N., and the Arctic Ocean on the east side of the Rocky Mountains—while on the west side the northern limit may be generally indicated by the tramontane route of Sir Alexander Mackenzie, between the parallels of 48° and 52° N. The researches of Behring, Tchirikoff, and Kotzebue among the Russians—of Drake, Meares, Vancouver, Cook, Beechey, and others among ourselves, were confined to the exploration of the coast. The overland expeditions of Lewis and Clarke in 1805, and of Hunt in 1811-12 among the Americans, as they did not embrace any of the territory beyond the parallel of the mouth of

the Columbia, may be said to have added little or nothing to our previous knowledge. A considerable portion of the country to the N. of the line here drawn, has been long since settled by the servants of the Hudson's Bay Company; but, so far as I am aware, its geography has been very little attended to. By a late compact with the Russian government, a large accession has been made to their territories, which now extend as far N. as Cape Fairweather; and it is to be hoped some enlightened men will be found among their number who will respond to the calls which science has so long been making on their exertions.

Under the circumstances to which I have thus briefly adverted, I trust I shall be justified in offering my mite towards the attainment of the desirable objects which the Geographical Society has so much at heart. For the meagreness of the following details I can offer no apology further than that, in the circumstances in which I was placed, it was impossible for me to make them more ample or more worthy your notice. The party to which I was attached, it must be remembered, was fitted out solely for the purpose of establishing a trade with the Indians, towards which it was of course expected by our employers our undivided attention should be directed. The duties of an Indian trader are of sufficiently multifarious a nature to occupy the attention of any man, and I think it unnecessary to state that under happier auspices, and had the sanction of the Hudson's Bay Company been extended to the undertaking, I should have been enabled to devote more time to those botanical and geological researches which confer so much value upon the narratives of my predecessors in Arctic discovery. To my senior officer Mr. Bell I owe much, as well for many acts of personal kindness as for his valuable assistance in the survey, which he was the more anxious to promote as it referred to a route which he was himself the first to open up.

On his return from his second expedition to the shores of the Polar Sea, Sir John Franklin, while ascending the Mackenzie a little above lat. $67^{\circ} 42'$, was led into a river which he had not discovered in his descent. From its large size he at first mistook it for a branch of the Mackenzie, and ascended it a considerable way under this impression; but finding his mistake, he retraced his steps, and regaining the main river continued his route upwards.* The favourable accounts he gave of the new river, which in honour of Sir Robert Peel he named Peel River, and more particularly his representations that the Indians inhabiting its banks were clothed in furs, soon attracted the attention of the gentlemen of the Hudson's Bay Company, to whom he communicated this information. It was not long before it was ascertained that the

* See Franklin's Second Journey, p. 181.

country contiguous to the Peel was the favourite habitat of those animals whose skins found their way by barter between one tribe and another to Fort Good Hope, the lowest establishment of the Company on the Mackenzie, and at that time the most flourishing post in the district.* The project of establishing a fort in this rich region was early formed, and instructions were accordingly issued to the superintendent of the district to take the necessary steps to that effect. Various obstacles intervening delayed the desired settlement, till, in 1839, Mr. Bell, an experienced clerk, was commissioned to make a preliminary examination of the river, and apprise the natives of the Company's intentions to open a trade with them in the ensuing season. The result of his exploration was such as to induce Mr. McPherson, the manager for the Company at that time, to decide upon establishing a trading post there the year after, and Mr. Bell and myself were accordingly appointed on this duty.

Shortly after Mr. Bell's departure for Fort Good Hope, his winter station, we were visited by Messrs. Dease and Simpson, who having completed, for the time, their survey of the coast, had come to pass the winter with us. Mr. Simpson left us in December, and at parting was kind enough to leave a pocket-sextant and a spirit-level with me, and as I had besides two very good compasses and the free use of Mr. Bell's valuable watch, which he had newly received from a London maker whose name I do not at this moment recollect, I unexpectedly found myself in possession of the means of making a survey, the result of which is the chart which I have now the honour to lay before you.

On the 25th of May, 1840, I left Fort Simpson, with the intention of joining Mr. Bell at Fort Good Hope, where I found everything in readiness for our immediate departure. Our party consisted of Mr. Bell and myself, twelve Orkney-men and Canadians, and four Indians with their families, who were engaged to act as fort hunters. We were supplied with an abundance of goods for the trade, implements for building, and as much provision as our craft could stow. On the 3rd of June we left Fort Good Hope in two boats, and by rapid travelling arrived at the mouth of Peel river about noon on the 6th. Here we found a party of the Indians belonging to the river, who, aware of our intention to settle among them, had waited for us at this place with the view of acting as an escort to our party in the event of a collision with the Esquimaux, whose uniform hostility to the

* The Hudson's Bay Company's territories, for the convenience of management, are parcelled into "districts," over each of which an experienced officer is selected to preside, with such discretionary powers for the conduct of the business as the general "council," which meets once a year, may think proper to invest him with.

whites rendered a meeting with them anything but desirable. These simple and kind-hearted creatures received us in the most enthusiastic manner, and testified their joy by singing and dancing incessantly the whole time we were on shore. After distributing a few presents among them, and taking an observation for latitude, we embarked and commenced our ascent; several tracks of moose and a very recent one of a large grizzly bear (*Ursus ferox*) were observed along the banks, which were here very low and alluvial, and still miry from the recent subsidence of the water. The *Alnus glutinosa* and *Hippuris vulgaris* constituted the principal if not the entire vegetation.

An aft wind soon after rising, we proceeded at a rapid rate up the river, and encamped about 30 miles from its mouth in sight of the Rocky Mountains. The character of the country had even already entirely changed. The banks, though still low and alluvial, were strongly impregnated with dark vegetable matter, and clothed with a dense vegetation of pines, poplars, and a thick underwood of different kinds of willow; and so sudden had been the transition from sterility to luxuriance, that we could scarcely believe that a few hours before we had been travelling through bleak, unrelieved desolation. The flat, swampy soil bore evident indication of having been lately inundated, and the height to which the last flood had reached could be distinctly observed on the trees, which were thickly coated with mud up to the water-line. Next day we resumed our march, and passing the Rat River, found, about 10 miles above it, another large party of Indians encamped, who received us with the same demonstrations with which we were before greeted by their friends. This being the spot selected for the site of the establishment, we encamped; and as Mr. Bell had traced the river to its source the previous year, and it being desirable to get the buildings erected as expeditiously as possible, our survey for the time had to be postponed; and, owing to various circumstances which shall afterwards be mentioned, I was not able to resume it until the winter had permanently set in. Mr. Bell gave me the following account of the river above this point when he ascended it the year before. For about 30 miles above the situation of the fort it presents little worthy of notice, being similar in character to the portion already described. Here the first rapid occurs. It is caused by a contraction of the banks of the river, which here begins to flow over a hard, pebbly bottom that succeeds rather abruptly to the soft alluvial bed over which it had hitherto been observed to run. The natives at this place had constructed a barrier of basket-work, which extended completely across the stream, sufficiently open however to permit the water to pass freely through its interstices, for the purpose of catching the fish which ascend from the sea during the summer.

This was effected by a very ingenious contrivance. When I passed here in the winter, this specimen of Indian mechanics had been entirely swept away by the drifted ice. The rapid, we understood, was the general rendezvous of the more infirm members of the tribe and such of the women and their families as did not accompany their husbands on their hunting excursions. After the rapid had been passed, a very perceptible change could be observed in the swiftness of the current—a fact sufficiently accounted for by the circumstance that the stream was now rushing from the sub-alpine region of the mountains, along the base of which it had hitherto proceeded with a gentle and uniform flow. It would be tedious to describe each day's progress in detail; to-day's was but a repetition of yesterday's struggle against the rapidly increasing current; the men, now straining on the tow-line and dragging the reluctant boat after them—now plunging breast-deep into some river which poured its turbid contents into the main stream in the line of their march—now, when the current, directed by some opposing spit on the other side, bore down with its whole volume upon the bank which, by constant attrition, it had worn into a perpendicular cliff, and sometimes undermined it, embarking and bending to their oars, making for the opposite side with what vigour they might, when the everlasting tow-line was again thrown out, and the same unvarying round of tramping, tugging, and wading had to be repeated. Occasionally the monotony of the march was enlivened by a moose or bear appearing at the river's brink, at which times, especially when their stock of fresh provisions was ended, a general chase was given by old and young, and rarely was it desisted from till the unfortunate intruder was brought down. In the mean time they were advancing fast into the heart of the mountains. The banks of the river had now entirely changed their aspect, and instead of through the low, unvarying mud-cliffs, with the sombre and cheerless appearance which the recent deposit of alluvium had imparted to them, the water-course was not unfrequently through bold, romantic defiles, so steep and lofty as often to hide the midday sun from view. It was, however, soon found impossible to advance against the hourly increasing torrent with the cumbrous boat, and it was accordingly left in charge of half of the party, while Mr. Bell and the remainder proceeded up the river in a small Indian canoe, which had been stowed in the boat to provide for the anticipated emergency. Two rivers were shortly after passed flowing from the eastward, which were named after Messrs. Simpson and M'Pherson: they seem to be the main feeders of the Peel, into which innumerable little mountain rills also empty themselves.

Soon after passing M'Pherson's river, the canoe, for the same reason which had led to its adoption, was abandoned, and the

party proceeded on foot among the mountains, fording such streams as crossed their path, and, after no slight hardships and not a few complaints from some of the men of numbness in the limbs, produced by wading in water whose temperature was scarcely above the freezing point, though it was then the middle of summer, Mr. Bell reached what seemed to be the head waters of the Peel. The minute streamlets into which it had now ramified had become so insignificant, seldom exceeding 15 or 20 yards (feet?) in breadth, that he considered it useless to prolong the survey any farther, more especially as the short arctic summer was more than half over, and he had still the exploration of the Rat river before him. Accordingly, after making a hasty examination of the surrounding country, he commenced his return and soon arrived at the boat-encampment, where the rest of the party awaited him. The boat was again launched; and, borne onward at a rapid rate, they soon reached the branch which communicates between the Peel and Rat rivers.* This little stream is very tortuous, and cuts completely through the mountains at nearly a right angle to their general bearing, but so level is the bed which it has found for itself between the mountain ridges, that it is often difficult, in the middle of summer, to say whether it flows from the Peel to the Rat or from the Rat to the Peel river; an evident proof that its current is entirely regulated by the relative heights of the two streams which it connects. At the time of their visit the current was setting into the Peel, and it was with no small astonishment that the crew, after mounting the stream for some time, suddenly found themselves in what they deemed a continuation of it, sweeping down at a rapid rate towards the sea. Apprehensive of meeting with the Esquimaux if they followed the course of Dease's branch (into which they had now fallen) to the sea, Mr. Bell did not think it prudent to venture further than about 20 miles from the fork, and accordingly turned after proceeding thus far and continued his course up the Rat river. His intention was to trace it up as far as the portage, where he expected to meet with the Tramontane Loucheux (probably the mountain Indians of Captain Franklin), who annually resort to this rendezvous for the purpose of trading with the Indians on the Peel. After a few days of smooth travelling, compared to what they had previously been engaged in, the party arrived at the Portage, where they found a large band of the Indians they had expected already

* What is here called a 'branch' communicating with the Rat river is set down by Mr. Isbister, in his map, as a continuation of the Rat river itself. It would, in fact, be a Deltic branch of that river, if its waters always flowed into the Peel; but as they sometimes flow in the contrary direction, it is one of those anomalous features in hydrology for which the science has not as yet any specific name. It is, like the Cas-siquiare, a connecting channel between two distinct basins.—Ed.

encamped. After some time had been spent in bartering such furs as the Indians had to dispose of, Mr. Bell commenced his return, and reached his winter quarters, as I have before stated, in safety, after spending a little more than two months on the river.

The district through which the Rat river flows, as a reference to the sketch-map will show, is of a very different character from that through which the Peel takes its course. It derives its waters from numerous small lakes, with which the flat swampy country to the W. of the mountains is studded, and being thus independent in a certain measure of the annual melting of the snow, which is the great support of the Peel, it is comparatively little affected by the summer heats, and consequently suffers but little augmentation of its volume from this cause. Its water has the peculiar swampy taste which indicates its origin. Its banks are low, with little or no wood, but clothed instead, with a long rank grass and some dwarf willows, with occasionally a few interspersed clumps of stunted pines. The soil is composed of strata of various coloured sands, overlying clay enclosing gravel and small water-moved boulders, and supporting a thin vegetable coat, in many places going to peat. The river, when I saw it in the winter, some distance above the Portage, trends to the S., and, according to the account of the Indians, extends to a considerable distance into the interior.

[Mr. Isbister now occupied himself in taking observations for latitude and longitude, and testing his instruments in every available manner, although he was constantly interrupted by the imperative necessity of attending to the arduous duties of his station; and we only regret that our limits prevent our giving at length the stirring narrative of his detached excursions.]

From the time, says he, of my arrival from Fort Good Hope till the middle of December, I was constantly on snow-shoes, visiting different places along the river, and in searching for lakes in its vicinity. During these excursions I had ample opportunities of surveying the river, and the country to the eastward. I had been able to lay down a considerable portion of the stream, by tracing it up through all its windings, but having to carry all my provisions, blankets, &c., on my back, by which means long voyages were utterly impracticable, and finding from the time consumed in this mode of exploration, and from the great impediment which the uneven and broken-up surface of the river presented to our progress, that it would be impossible for me to complete the survey on this plan, I was obliged to adopt another. We heard that a numerous band of the "distant Loucheux" were encamped on the upper part of the Rat river, on the W. side of the mountains, with a plentiful supply of the com-

forts of life, of which we had hitherto enjoyed so scanty a share. With the twofold motive of tracing the Rat river, which as yet had been but partially surveyed, crossing the mountain-chain, and obtaining some provisions, I resolved to go in quest of them. Five of our own people and seven Indians (our four hunters and three Loucheux, who had given us the information) volunteered to join me. Having equipped ourselves with ammunition and some tobacco for the Indians we expected to meet, and 15 lbs. of pemmican (the usual allowance for one day to one-third of our number), we set out long before dawn, and soon reaching the mountains which were about 10 miles distant from the river, encamped the first day under a small clump of trees in one of the valleys of the first range. The next day a little before sunset we reached the summit of the middle and highest range. We were now exposed to the full fury of a storm, from which we had hitherto been partly sheltered, but which now swept with fearful violence over the dreary, shelterless waste, and exhausted as we were with hunger, cold, and the fatigue of a hard day's march, we had no alternative but to push on, whatever the consequences might be, till we came to wood. After travelling all night, about noon we found ourselves at the entrance of a shelving valley, which led us to a deep gorge, evidently the bed of some mountain *coule*.* We scrambled down its precipitous sides, resolving to follow its course, in the hope that it would lead us to wood, where we might encamp; and we had no sooner reached the bottom, than we found ourselves in an agreeable calm, while the temperature had, to our sensations, risen more than 20°. The walls of the defile were from 400 to 500 feet high, and composed chiefly of a reddish compact limestone, with partings of dark carbonaceous matter, which at a distance gave it the appearance of the slaty structure, reposing upon primitive rocks. Its course when we fell upon it was S.S.W., but it soon changed to W. Wolves, mountain goats, and rein-deer were occasionally observed on the high ledges above us, but beyond the reach of our guns; and, what was still more acceptable to us, thin clumps of wood began to open on the view. About an hour's walk further on brought us to a fine hummock of pines, where we encamped; and, as soon as the fire was kindled, and our frozen limbs thawed, we lay down to sleep with feelings which few of us can ever forget.

Having coated our faces with grease as a defence against the raw air, we started alert and fresh from our night's repose. After a day of pleasant travelling, enlivened by an animated chace after

* From *couler* (Fr.), to flow; probably a Canadian name for a stream or torrent. Thus, "Coules des Roches," a river of the island of Montreal.—Ed.

the rein-deer, which were often met with in large herds, we encamped near a bend of the Rat river, in lat. $66^{\circ} 50'$, and long. 138° W., in a low level country about 20 miles beyond the mountains. Next day, a hard march of fifteen hours in a S.W. direction, brought us to the Indian camp above the Portage, where we were received with unbounded hospitality.

It being necessary to wait a few days here till such of the party as were out hunting should return, I spent the interval in tracing the course of the mountains to the southward and examining their geological structure. On my return I found the party ready to start. After seeing them fairly on their way under the direction of our own people, I left them to pursue their route at leisure, and, selecting two of the most active of the Loucheux, I proceeded upwards along the mountains, in order to satisfy myself fully of the continuity of the chain, and crossing them near one of the points to which I had carried my survey from the other side, I followed the river down to the fort, where I arrived in time to receive our friends whom we had left behind.

As soon as the Indians had gone, being necessarily confined to the house for some time until my wounds had healed, I employed myself in finishing the chart of the Rat river. For the interstitial data I was here, as before, in the case of the Peel, indebted to the notes of Mr. Bell. Dease's branch, which, from want of time, I was unable to follow to the sea, flows, according to the information of the Indians, through a low level country, well wooded with spruce firs, and frequented by moose and rein deer, and I have little doubt it is the same with a river observed by Messrs. Dease and Simpson, to flow into the most westerly channel of the Mackenzie, a little before it joins the sea.

On the 15th of April I left Peel river, along with four men, and crossing the country with the view of falling upon some part of Red River, I traced it for about 20 miles to its junction with the Mackenzie. It is about a quarter of a mile wide where I saw it, and rises, according to the Indians, in the mountains, and flows through a district similar to that which borders the Peel.

The cold during the months of January and February was intense; the thermometer ranging between 40° and 67° minus.

Natural History.—The valuable writings of Dr. Richardson have so amply illustrated the natural history of the arctic regions, as to render it unnecessary for me to dwell at any great length upon the productions of the district laid open by our expedition, and indeed such was the harassing nature of my duties, that, rich as an unexplored country always is in objects of interest to the naturalist, I could spare but very little time to such investigations. It is generally admitted, as a botanical axiom, that the more di-

versified the surface of any country is, the richer, *cæteris paribus*, will be its "Flora," and to this general principle the region through which the Peel flows furnishes no exception. At its mouth, as I have already observed, the vegetation is spare and scanty, but at a short distance up, as soon as we reach the shelter of the mountains, it breaks out into a luxuriance unknown on the Mackenzie in the same latitude. The *Pinus alba*, *Populus trepida et balsamifera*, the latter of which affects the drier situations, *Alnus glutinosa*, a few *salices*, and a rank growth of different herbaceous plants, clothe the banks to a distance of from 4 to 5 miles on each side. Somewhat higher up we meet with the *Betula glandulosa*, *Pinus microcarpa*, and *Juniperus prostrata*. These constitute the principal arboreous plants to be met with, and they may be found in variable proportion, fringing the river for about two-thirds of its course. Above this, wood becomes scarce. *Saxifragæ*, lichens, and other rupestrine plants, and different kinds of moss in the swampy districts, constituting the prevailing vegetation; while the lofty rocks, among which the river here sweeps, are almost entirely destitute of any covering. The *Betula papyracea* and *Pinus Banksiana* are said to occur in the dry valleys among the mountains, but I never met with either of these trees myself, and I am disposed to regard their existence as extremely doubtful. The *Pinus alba* is the king of the arctic forest, and it grows to a considerable height for so high a latitude. One which we felled for the buildings measured 70 feet in height and 3 feet 3 inches in diameter at the base. It forms a conspicuous ornament to the borders of the river and the larger lakes, but never extends to any great distance inland. The alder is generally found accompanying it, forming a dense underwood, while the soil itself is generally covered with moss, studded, in favourable seasons, with *vaccinium* and *Rubus chamæmorus*, which grows in immense quantities. Towards the mouth of the river the surface is generally usurped by *Hippuris vulgaris*, or a coarse grass. Beyond the locality of the *Pinus alba* the prevailing tree is a stunted *Pinus microcarpa*, thinly strewn over the country, which scarcely supports anything else but mosses and lichens. This is the general description of the unbroken flat which extends to the west of the Rocky Mountains. These few observations will serve to give a general idea of the botanical features of the country. My very limited experience in cryptogamic botany, the lack of the necessary time and opportunities, and, above all, the want of the indispensable requisites of paper for forming a collection, a microscope, and a catalogue to which the species might be referred, put it out of my power to enter into more minute investigations.

The zoology of Arctic America is so well known, and the

“fauna” of Peel river, richer though it be in degree, differs so little in kind from that of the neighbouring district of the Mackenzie, as to render it unnecessary for me to enter into any details upon this subject. The rocky mountain range which farther to the S. exercises so marked an influence on the geographical distribution of animals, seems here to lose its distinctive character; all the animals found on the E. side being met with in equal, if not greater, abundance on the W. From this remark, however, the moose-deer (*Cervus alces*) is to be excepted. As far as my own observation and information went, they are not found beyond the mountains, which may thus be considered the western limit of their range. The mountains themselves are principally inhabited by the grizzly bear, the common wolf, the ovis montana, and capra Americana of Richardson. The musk-ox is said to occur in the country to the W. of the Rat river. These are the only peculiarities which seem to call for notice under this head.

On the subject of geology, I have little to add to the incidental remarks I have already made. The soil of the lower part of the valley through which the Peel flows is generally an alluvium derived from the annual overflowings; and from the accessions it yearly receives from this source, it has attained in some places to a considerable thickness. On penetrating this we come to a diluvium, containing gravel and small boulders, which becomes the subsoil immediately underlying the thin vegetable covering of decayed moss, &c., wherever the inundations have not reached. Higher up, thick beds of aluminous shale occur, and the soil is in many places strongly impregnated with alum. A hill by the river side, a little below where it emerges from the mountains, was found to be so rich in this mineral, that it obtained the name of “Alum Hill.” Several very pure crystals were picked up on its sides. Alternating with the shale we sometimes find thin strata of brown coal, a formation which seems to be extensively distributed over all the country N. of Slave Lake. A loose red sandstone prevails in the district W. of the Peel, and is apparently the general underlying rock to these superficial deposits. It first appears a few miles above the Fort, where a thin belt is observed to run across from the “Narrows” of the Mackenzie, cropping out occasionally as it approaches the mountains, and forming an undulating ridge of low hills. Most of the elevations which occur on the W. side of the river are due to the faults or other local displacements of this formation. To this succeeds a limestone deposit. The line of junction of the two rocks can be distinctly traced at the Narrows, and also in some situations in the mountains where the limestone is observed to crop out from under the sandstone, crowning some of the higher ridges. The

country between the two rivers, though generally low and swampy, is occasionally intersected by ranges of hills which are apparently low spurs from the neighbouring mountains. With regard to the Rocky Mountains themselves, those great geological parents of the new continent, and the great modifiers of its climate, their geological structure is here of a very simple type. Obeying highly uniform laws of arrangement, they are in a great measure free from those interruptions which occur in the more complicated mountain groups of Europe, whose irregular and often contradictory structures, arising from the numerous cross chains which intersect each other, it is frequently difficult, as has been often observed, to reconcile or explain. Opposite the Fort, the range has dwindled down to a comparatively insignificant elevation, few of the peaks rising above 600 or 700 feet in height. The chain, however, continues decided and unbroken till it is intersected by the Rat river, where the continuity is suddenly arrested. Viewed from the W., they present a soft undulating outline, rising in a series of terraces, the inferior ridges consisting generally of sandstone, while the higher are capped by limestone. As we trace their course to the S. they gradually increase in altitude, and assume a more irregular and rugged appearance; rising often in abrupt precipitous crags, and presenting the general characteristic features of a primitive district. Gneiss, syenite, greywacke, and slate, and more rarely granite, occurring in their usual geognostic relations, and imperceptibly merging into each other, form the general nucleus over which sandstone, in the inferior, and limestone in the higher ranges are generally dispersed, while in other instances, the examples of which multiply as we proceed southward, the primitive rocks protrude in bold, craggy peaks and irregular ridges. The ranges vary from 10 to 5 in number, pursuing a relatively parallel course, and occupy from 50 to 90 miles in breadth. The eastern aspect presents a remarkable contrast to the western. Rising abruptly from the barren flat which reaches almost to their very base, their steep, castellated flanks contrast strongly with the graduated approaches of lower hills which are observed on the other side of the range. As might be expected primitive and transition formations predominate on this side; some of the scarped walls exposing greywacke and greenstone. Gneiss and slate, which I rarely met with in the lower part of the range, become more abundant as we advance to the S., where gneiss seems to be the prevailing primitive rock. Fringing the lower eastern border are interrupted chains of isolated peaks, which on being traced up prove to be abortive ranges, and, what is worthy of remark, these, generally speaking, attain a higher elevation than the main chain, and are almost entirely of primitive or transitional structure.

The greatest number of ranges which I observed were 10, and these, so to speak, die away, the outer ranges on both sides sending off spurs, not always easily referable to their originals, till they reach the Rat river, when they are reduced to five. Here the continuity of this remarkable chain of mountains may be said to end. Beyond this limit we find them forming straggling irregular ridges and solitary peaks, without parallelism or continuity, though when viewed from a distance the whole mass may be seen trending towards the coast and still preserving a connected outline. The succession of strata from secondary to primitive, which I have described to be from W. to E., appears to be the reverse of that observed by James, Douglas, and others, in the more southerly sections of the range, while at the same time they agree in characterizing the eastern aspect as abrupt and precipitous. The high sandstone walls which they speak of as occurring on this side I did not meet with, though it is highly probable that the underlying rock in the neighbourhood of the Rat river is of this material. The season at which I visited this part of the country was very unfavourable for geological investigations, and the deep covering of snow, which lay everywhere on the ground, prevented me from profiting by any natural sections which might exist in the district, so that I was unable to satisfy myself how far this conjecture might prove true. The result of my cursory observations I have already given in a former page when speaking of the Rat river.

I have designedly omitted any detailed account of the Indians of this quarter, as the many interesting anthropological questions which would arise out of this subject would lead me beyond the limits which I have prescribed for myself in this short sketch, and would besides be anticipating what I mean shortly to lay before the public in another form. Being myself a native of the country, and familiar with the languages and customs of most of the Indian tribes, on the E. side of the mountains at least, I am not without hopes that I shall be able to add somewhat to the slender stock of facts which seems to be possessed by many of the writers on the subject of the aboriginal population of America.
